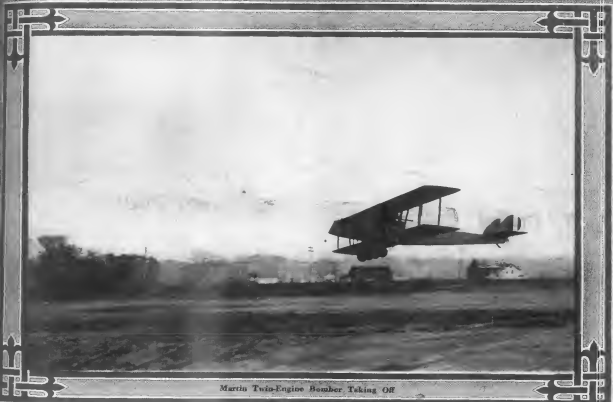


JANUARY 15, 1919

PRICE 25 CENTS

AVIATION AND AERONAUTICAL ENGINEERING



Martin Twin-Engine Bomber Taking Off

VOLUME VI
Number 2

SPECIAL FEATURES

THE 80 HP. LE RHONE AIRPLANE ENGINE
NAVY ISSUES SEAPLANE SPECIFICATIONS
THE CURTISS TYPE 18-2 TRIPLANE
TOPOGRAPHIC SURVEYING BY AERIAL PHOTOGRAPHY
FORMULA FOR APPROXIMATING PROPELLER DIAMETER

PUBLISHED SEMI-MONTHLY
BY

THE GARDNER-MOFFAT CO., INC.
HARTFORD BUILDING, UNION SQUARE
22 EAST SEVENTEENTH STREET, NEW YORK

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FEBRUARY 15, 1919

AVIATION

AND
AERONAUTICAL ENGINEERING

VOL. VI. NO. 2

Member of the Audit Bureau of Circulations
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AVIATION AND AERONAUTICAL ENGINEERING

ALEXANDER KLEINER
EDITORIAL MANAGER
LEONARD FORSYTH
ASSOCIATE EDITOR
GEORGE NEWBOLD
BUSINESS MANAGER

No. 51

February 11, 1935

No. 2

THE lack of emphasis that is placed on the need for officers trained in aeronautical engineering for the Air Service in all plans outlined for the future, should be corrected, for the greatest need that the country will have in its aerial development and the wisest one to supply is for trained engineers in the air.

It used to be customary that the highest ranking pilots at the Military Academy at West Point were assigned to the Engineer Corps and the advancements of this branch of the army have reflected the policy. As a branch of engineering requires a considerable knowledge of a technical nature than aviation, some provision should be made for the training of officers in air service.

The Navy has always excelled in engineering owing to close contact with all its problems. It may be that the results which the naval aviation program secured during the war is due to the training of the officers as engineers.

In view of the preliminary instruction which is given military aviators in military technical, it would be an unfortunate policy to put these officers in engineering positions of authority, even for general maintenance work. During the war the Air Service has been able to draw, for its technical personnel requirements, upon a vast reservoir of reserve officers who were sufficiently trained for this emergency by virtue of their pre-war education. However, for the future, compulsory training should be developed for imparting useful technical training to engineer officers of the Air Service, because the work of creating such a corps by improvisation will grow more and more difficult as the special technique of military aeronautics expand.

For accomplishing this result two courses are open. The first consists in providing within the Air Service Academy the War Department program to establish, for an aeronautical engineering department, to which the most promising officers would be detailed. The alternative, for which method the Navy furnishes a successful precedent, would consist in sending officers for specialized training to engineering schools. The latter has been the less expensive method of the two, and has, furthermore, given most excellent results, for the Navy has thus been able to secure for its specially selected officers a broader training than could be given by a limited course.

The Radial Fixed Cylinder Engine

In a recent paper read before the S. A. E. very interesting study is made of the radial fixed cylinder engine, of the air cooled type. Very usually the author concludes that the revolving air cooled engine has reached

the limit of its development, and that the rotating water cooled engine has too many inherent disadvantages to be seriously considered.

We differ from the statement that the V-type water cooled engine has been fully developed. It is true that for war purposes the 400-hp Liberty is an almost perfect example of this type. But the 400-hp is not the limiting size of the V-type engine. For military purposes the large day or night bomber still remains to be equipped with two 800-hp V-type engines, for the large commercial passenger or freight carrier, for the transatlantic airplane, development along the same lines is required. The present one V-type aeronautical engine also requires considerably more study, if it is to be really adaptable to commercial use. The war has produced its development to an extreme of lightness. Now its weight must increase—as little as possible of course—to give greater reliability and smoothness of operation, less rapid deterioration and less repair work. The work on this type is by no means exhausted.

Still thinking in the war way, however, the radial engine does certainly seem to offer possibilities. Consequently weight of power plant, very interesting figures are given. For a new design of a 2000-hp, ten-cylinder radial air-cooled engine of a 17/32 in bore and 4½ in stroke a weight of less than 1.8 lb per hp, installed is claimed. The Liberty motor complete with cooling system actually is in the neighborhood of 2.5 lb per hp. Official British reports give a fuel consumption of less than 0.5 lb per bhp-hr with a fuel consumption of less than 0.02 lb per bhp-hr. This compares very well with the consumption of any water-cooled motor.

The cooling of a water-cooled V-type motor is a difficult problem in design, but not an insurmountable one, and by the use of shutters, or other simple mechanical devices, it can be made to adjust itself to any altitude. In the fixed radial there is said the difficulty that we are not able, as yet, to vary at will the cooling of the engine, and this may be a serious drawback.

It will certainly be quite as accessible, if not more so, with the V-type. Whether in large sizes it will lend itself to streamlining effects of the body is doubtful, since the maximum diameter of the engine is likely to be very large.

It will certainly be more easily detachable. The actual mounting of a radial engine will present somewhat greater difficulties, with its necessitating surface action, than the V-type, which can be made to sit snugly on vee-rod engine mounting.

On the whole, the development of this type of engine should be strongly encouraged and airplane constructors will no doubt watch this with considerable interest.

The 80 Hp. Le Rhone Airplane Engine

The 80 hp. Le Rhone inverted cylinder engine is one of the few post-war types currently sold. It has been used extensively at the front for scout and combat duty, but of late principally in observation and bombing, notably in the twin-engine Caudron biplane. Its last country it has been used in four solo scouts for advanced training in observation and combat flying. The Thomas Moore M-4-E, the Standard MKI Scout and other smaller planes being used.

The Union Switch & Signal Co., a Westinghouse concern with plant at Syracuse, N. Y., in the Pittsburgh District, were asked upon its introduction the Le Rhone 80 hp. engine in October, 1917, and the drawings were furnished from that time.



FIG. 1. FRONT VIEW OF THE 80 HP. LE RHONE ENGINE.

time. Machinery was immediately installed in a new engine factory building and production engines were accepted by the Government the following April.

The engine produced in a copy of the French engine with changes in some minor details and with materials selected from American sources. The materials have been superior to those of the French, which together with special treatment, has resulted in practically eliminating engine failures from defective materials. The engine is almost entirely constructed of steel, the only castings being pistons, connecting rods and bearings, thrust block bars and a few accessory parts, there are 32 forgings. The initial weight before machining is 1160 lb., the finished weight is 984 lb.

Advantages of the Rotary Engine

1. The elimination of cooling water, radiator and piping by revolving the water-cooling cylinder in the air at high speed.
2. The arrangement of a number of cylinders as a short crankshaft with only one crank pin gives a light weight, compact unit.
3. Regular rotation and an absence of vibration as produced by the flywheel effect of the cylinders and crankshaft revolving at high speed.
4. Owing to the absence of water cooling, the erosion and disintegration of the engine on the plane can be carried out with complete safety and in minimum time, this was especially in the design of the engine noted for ease in its disassembly.
5. From a military standpoint, the air-cooled revolving cylinder engine is much less susceptible to injury and makes

an effective shield for the pilot against heat on landing gear fire.

The Principle of the Rotary Engine

The Le Rhone is a simple four-cycle engine in which the functions of inlet, compression and exhaust take place in the same cylinder as in a four-cycle engine of the fixed cylinder type. When the engine is fixed (Fig. 2) the line of the explosion moves the crankshaft but when the crankshaft is fixed (Fig. 3) the force of the explosion moves the cylinder in the opposite direction.

The crank OT being fixed, the cylinder C is free to revolve around the engine center O. The piston A turns about the

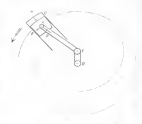


FIG. 2. REVOLVING CRANKSHAFT ENGINE.

crank F with the connecting rod FA as radius. Due to the eccentricity of these axes of revolution, one cylinder of the cylinder will produce a complete stroke of the piston, when the distance between the piston and the top of the cylinder and likewise the length of the bar OA, varies with the position of the radius FA. The distance is a maximum when the cylinder is vertically below O and a minimum when it is vertically above F. The difference between these distances is equal to the stroke of the engine or twice the length of the crank OT.

When the explosion occurs the force F is resolved into a force G in the direction of the connecting rod FA and a force T at right angles to the crank bar OA of the cylinder and piston. The force F is destroyed by reaction upon the point F in fixed and the force T tends to turn the cylinder around the center O in the direction of the arrow.

In order to balance the rotating masses and eliminate dead motion, three are arranged around the crankshaft a number of cylinders as the one crankshaft.

To produce an even torque, the cylinders must be arranged so that, as they fire, their momentum all would fire in one revolution and even in the next. As odd number of cylinders must be used to provide equal intervals between the explosions.

As an example, if the cylinders are 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

FIG. 3. FIXED CRANKSHAFT ENGINE.

Features of Design

The engine consists of two elements, the fixed part and the rotating part.

The fixed part consists of a hollow crankshaft, two engine supporting plates and the waterpump. The waterpump is actuated by the crankshaft and the crankshaft is driven by the explosion mixture through the hollow shaft to the crankshaft.



FIG. 4. CONNECTING ROD DESIGN.

one. On the main supporting plate, which is fixed to the crankshaft, are mounted the magneto, the distributor break and the oil pump. The short end crank, formed by the extension of the shaft at the propeller end, is located on the crank pin by a taper and nut and is held in a locknut.

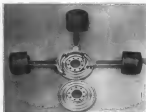


FIG. 5. THRUST BLOCK WITH OVER-TYPE CONNECTING ROD AND PISTONS.

The crank shaft is machined from high grade chrome-nickel steel having all bearings to give high clearance limit and weighs 60.5 lb before and 13.10 lb after machining.

The rotating part consists of crankshaft, cylinder, intake head, piston with connecting rods and thrust block, valve gear and governor distributor.

Ball bearings are used exclusively for rotating elements. There are one set of ball bearings on the crankshaft. All the ball bearings within the crankshaft and bearings are of the superior type.

The crankshaft is at the base of a steel cylinder machined with nine bore bearing in which the cylinders are secured. It is a 40 to 50 per cent carbon open hearth steel forging, specially heat treated and weighs 218 lb before and 205 lb after machining. The propeller shaft is made integral with the fixed crankshaft cover and is machined from a chrome-nickel steel forging, oil tempered. The thrust

bearing housing is bolted on the rear of the crankshaft, and on it are mounted the magneto and on pump drive gear and the ignition distributor mag. The crankshaft parts revolve about the shaft on three sets of ball bearings, the propeller shaft is attached by a double set ball thrust bearing.

The cylinder is a 44 to 50 per cent carbon open hearth steel forging weighing 325 lb before and 75 lb after machining, specially heat treated after rough turning and low cooling first turned on the outside barrel and on the head. It is provided with a cast iron liner pressed into place.



FIG. 6. VALVE GEAR.

The cylinder, held in the crankcase by thrusts at its base, is prevented from further rotation about its own axis by a locknut which screws down against the crankcase base. In each engine assembly, in order to prevent vibration, each cylinder is secured on large equal weights. They must have an odd equal total or odd weight, but they must also have the same diameter weight or moment about the center of engine rotation.

The two valves, with seats ground in the steel cylinder head, are secured by an overlapping rubber seal and a single push rod, the rod ends being supported on two ball bearings. The valves are made of chrome-nickel steel, and are provided with a screw driver slot for grinding in the 3000 day test. The guide is a cast iron bearing, pushed into a slot, retaining sleeve which is screwed into the valve cage and held by a locknut.

The valve spring is of steel wire single rod, of 35 lb diameter with the valve in a closed position. No spring is required except at starting, at a speed of 1,200 r. p. in the centrifugal force setting on the valve is about 85 lb.

The upper intake head, which houses the centrifugal mixture from the crankcase to the intake valve cage are made in two pieces with a slip joint held by a rubber ring.

Pistons

The piston, a general inverted casting, is 0.6104 in. thick at the head and weighs 1.6 lb. The maximum clearance for pis-

In case of a wreck, it is desired that the distaste elements will remain attached to the fuselage and support in such the crew seats may rise.

(b) **Displacement.**—The air the machine should be in proper design, including the fuselage, wings, tail, and landing gear, and the engine, propeller, and other accessories. The total weight of the machine should be such that it will be able to take off in a short time, and the landing gear should be such that it will be able to land in a short time. The machine should be able to take off in a short time, and the landing gear should be such that it will be able to land in a short time. The machine should be able to take off in a short time, and the landing gear should be such that it will be able to land in a short time.

(c) **Engine and Landing.**—The engine should be equipped with a power supply system and a landing gear system. The engine should be equipped with a power supply system and a landing gear system. The engine should be equipped with a power supply system and a landing gear system. The engine should be equipped with a power supply system and a landing gear system. The engine should be equipped with a power supply system and a landing gear system.

Construction

Simple construction was required from builders which could be put into production in a short time.

(a) **Weight.**—The weight of the machine should be such that it will be able to take off in a short time, and the landing gear should be such that it will be able to land in a short time.

(b) **Strength.**—The machine should be able to take off in a short time, and the landing gear should be such that it will be able to land in a short time.

Dimensions

The machine should be able to take off in a short time, and the landing gear should be such that it will be able to land in a short time.

(a) **Length.**—The machine should be able to take off in a short time, and the landing gear should be such that it will be able to land in a short time.

(b) **Height.**—The machine should be able to take off in a short time, and the landing gear should be such that it will be able to land in a short time.

(c) **Weight.**—The machine should be able to take off in a short time, and the landing gear should be such that it will be able to land in a short time.

The Curtiss Type 18-2 Triplane

The Curtiss type 18-2 triplane is a high-speed two-seater fighter of distinctly original design which presented to constitute a noticeable American contribution to the latest fighting air-



FRONT VIEW OF THE CURTISS TYPE 18-2 TRIPLANE

force, had not the war come to an end through the armistice.

The wings of this machine have an equal span of 35 ft. 11 in. and a chord of 40 in. There are six air struts of 2 1/2 in. dia. at 8 deg. sweepback, with no dihedral or stagger. The wing curve is a shallow "S" shape. The gap between the upper and the middle wings is 42 in., while that between the middle and lower wings is 30 1/2 in. The wings are braced by one pair of interplane struts on either side of the body, and the outermost struts, leading, and innermost struts. The upper wing is braced in a similar man-

ner. The machine has an overall length of 22 ft. 3 1/2 in. and an overall height of 6 ft. 10 in.

The wings have the following areas: upper, 120 sq. ft. middle and lower, 97 1/2 sq. ft. each, sloping in middle and lower wings only, 22 sq. ft. each, which gives a total wing surface of 340 sq. ft.

The horizontal stabilizer is 18 1/2 sq. ft. in area, the vertical stabilizer, 5 1/2 sq. ft. the elevators, 8 1/2 sq. ft. each, and the rudder, 12 sq. ft.

The engine is a Curtiss model K-12, which is rated 400 hp.

The machine has an overall length of 22 ft. 3 1/2 in. and an overall height of 6 ft. 10 in.

The wings have the following areas: upper, 120 sq. ft. middle and lower, 97 1/2 sq. ft. each, sloping in middle and lower wings only, 22 sq. ft. each, which gives a total wing surface of 340 sq. ft.

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The engine is a Curtiss model K-12, which is rated 400 hp.

at 2250 r.p.m. and weighs 1 1/2 lb. per rated horsepower. The fuel consumption is 0.55 lb. per h.p. and the oil consumption, 0.02 lb. per h.p., the total fuel consumption gear hour is 38.7 gal. A complete description of this engine was printed in the

and accessories, 381 lb. Total, 1670 lb.

From these figures the wing loading in sea is 16.4 lb. per sq. ft. and the power loading, 7.25 lb. per h.p.

The performance of the Curtiss type 18-2 triplane are as



SIDE VIEW OF THE CURTISS TYPE 18-2 TRIPLANE

Sea 5, 1500 rpm of AVIATION and AIRCRAFT ENGINEERING

The fuel loads of the type 18-2 hold 60 gal.

Full loaded, the machine weighs 2041 lb., empty, 1670 lb., the total load is 1670 lb., which is apportioned as follows:

Fuel, 60 lb.; oil, 45 lb.; pilot and passenger, 700 lb.; arm-

aments, reasonable and under open at the distribution of being one of the fastest, if not actually the fastest, machine in the world. The high speed, at horizontal flight, is 153 m.p.h., and the low speed, 43.2 m.p.h., the climbing speed is 13,125 ft. in 10 sec.

Topographic Surveying by Aerial Photography

By Arthur Brook, Jr., and L. J. R. Hobbs

Maps made from aerial photographs may be grouped into two principal classes, namely, plane tables maps and oval maps. The present article deals mainly with contour maps, since they embody features which make them especially

valuable for civil and commercial purposes, and thereby find their use in topographic surveying by means of aerial photography.

The first class of maps is the plane table maps, and the second class is the oval maps.

The first class of maps is the plane table maps, and the second class is the oval maps. The first class of maps is the plane table maps, and the second class is the oval maps. The first class of maps is the plane table maps, and the second class is the oval maps. The first class of maps is the plane table maps, and the second class is the oval maps.

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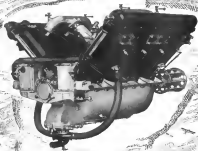


FIG. 1



FIG. 2

MASTER OF THE AIR The Hispano-Suiza Engine



HISPANO-SUIZA developed its world-wide reputation during the early stages of the Great War.

The very peak of its efficiency was reached when the Air Forces of France and England were gaining that now well-understood "Air Supremacy" at the end of the second year of the Struggle. It was then that France's most noted aces, Guynemer, Fonck, Herteaux and others were establishing their marvelous records in the small, swift, deadly one-seater planes—the "Spads"—which were made possible only because of the speed, flexibility and versatility of the Hispano-Suiza Engine.

Since then, in the powering of the one seater, the two and three seaters, and the heavier bombing machines and hydro-

planes, Hispano-Suiza has kept pace with the development of the aeronautical activities of several nations. Hispano-Suiza has reached that point of efficiency which would have been impossible, except where a fundamentally great engine had been developed by the most progressive basis of the industry.

These are the reasons for the master-ship of Hispano-Suiza.

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Aircraft Corporation
New Brunswick, N. J., U. S. A.



See The Hispano-Suiza Exhibit at
46 A-1 Stand, March 1-15, 1919

WRIGHT-MARTIN AIRCRAFT CORP'N.

News of the Fortnight

Appendix 8. A. E. Meeting

The annual meeting of the Society of Automotive Engineers, held on Feb. 4-6, 1916, at the headquarters of the society, in New York, was a representative gathering of the automotive world, both owing to the several important papers dealing with necessities that were presented and the large number of small engineers and officers of the Army and Navy Air services who attended the meeting.

During the presentation papers presented were: *Aluminum and Stainless Engineering*, by Condy H. C. Buchanan, M. A. S., President of the Naval Aircraft Factory; *During the War*, by Edward F. O. Coburn, A. S. M.; *Experimental Development Engineering*, by Alexander Klemm, Making the American Flyer, by George C. Levinger, The Liberty Aircraft Engine, by J. J. Vincent. Fixed Installment Calendar Engines, by John W. Smith.

The authors listed by the S & K for the current year are: Charles M. Manis, president, B & K Associates, Ltd. vice-president, S. H. Hobbs, assistant vice-president, representing machine tool engineering; Robert J. Kline, president, representing machine tool engineering; T. B. Fitch, second vice-president, representing machine engineering; John J. Amory, second vice-president, representing marine and electrical engineering; L. N. Gifford, second vice-president, representing machine tool engineering; and Raymond C. Johnson, president, representing machine tool engineering. Members of the Council are: E. A. de Meyers, David Ferguson, Robert J. Johnson, Charles N. Cavanagh, J. B. Whitcomb, David Bennett, Timm Sawyer, Charles R. Whitham, Secretary, and General manager.

Inter-Adapted Age Categories

The inter-alled air commission will meet in Paris shortly to settle the big problems connected with the aerial traffic of the world. Technical experts of the various powers now are engaged on plans to be submitted to the commission. The British scheme, according to the Paris edition of the London Daily Mail, is ready.

One of the chief difficulties to be overcome in the drawing up of a set of rules for aerial passage applicable to all nations, in view of the complicated geographical conditions. Ordinary rules for flying, such as speed, height, navigation, lights and so forth, are easily adjustable, but the political and economical aspects are bound to involve controversial points.

Lowery Menzies Makes Record

Major H. W. Schroeder, Air Service, the holder of the American altitude record, established a new record for women.

According to a telegram received from the Chief of the Technical Section, Division of Military Aeronautics, McCook Field, Dayton, Ohio, the Locust monoplane climbed to 15,500 ft. with three passengers totaling 470 lb. The pilot was Major R. W. Schneider, the observer, Lieut. George V. Eley, and mechanic, K. A. Craig. The previous altitude record for a monoplane with three passengers is understood to be about 15,000 feet.

A report from Mr. Loewig gives the time as thirty-two minutes, which would average approximately 300 ft. per minute.

British Are Hard Casualties

In raids on the United Kingdom by the Germans during the war 5613 persons were killed or injured, of whom 4720 were civilians. An official summary of the devastation caused by German airplanes, airplanes and bombardiers from the sea shows these casualties among civilians.

Those headed and the soldiers and mothers were killed and 600 were injured.

There were 2114 one rapid by airships, causing the deaths of 436 civilians and the injury of 1296 and the killing of 28 soldiers and sailors and the securing of 121

In 411-man airplane raids 615 civilians were killed and 1000 were injured. In these raids 736 soldiers and sailors were killed and 480 injured.

A. T. Macray Heads Beach Corp.

A. T. Murray, the acting head of the Bethlehem Works Corp., has been appointed president of the American Shovel and Machine Corp. at the start of the taking over of the Shovel Industries, Inc., owned jointly by the Alcoa Property, Controlled, Inc. Murray was appointed managing director of these interests, and his appointment at the extremely difficult situation which the acquisition of the Shovel activities involved proved him to be exceptionally fitted for this post.

The American Bush Magnesia Corp. has taken over the entire buildings and organization of the Bush Magnesia Co., including the great Bush works at Thompson, Mass., which comprises 200,000 sq. ft. in the building alone and employs 1,000 operatives. The company is headed by C. H. Smith, president; A. B. D. Allen, vice-president; Leon W. Hunsford, vice-president; J. A. MacFarlane, assistant treasurer and secretary. Its board of governors consists of J. A. Mernoy, Harry B. Ryan, George A. MacDonald, H. Gary N. Lee, J. W. Smith, J. W. Dyer, C. H. Smith, Philip L. Sullivan and H. H. Peck.

Paradise Air Line

Leaving of the American peace commission in Paris with Berlin by airline is planned in connection with the visit to Germany of an American mission which will need back reliable information as to conditions in that country for the guidance of President Wilson at the Peace Congress.

It is the intention to have AMERICAN ARMS available being back by supplies data collected by the mission. This will save much time which was lost because of the broken down train service and the delays between Paris and Berlin and unreliable wire communication.

The air control system will be operated in relay, like the old line pump system of the plant. The first light will be in locomotives of the Third Area, at Colburn, then following the River Main to the south and across the Fished Mountain to Prague. Changing again at Prague the airpumps will be driven in North Aerodrome and greater stations are now being constructed at Prague.

It is not believed to be possible to start an air courier daily, because the weather not always will permit that, but it is believed that an average of four days a week can be reached. A number of the foreign American army aviators had studied for assignments in this service.

McCook, Field for Cell Testing

To promote postwar development of the aircraft, the War Department has placed McCook Field, Dayton, Ohio, at the disposal of private enterprise for testing experimental types of machines. Regulations made public June 27 provide that all aviation tests shall be at the owners' risk and expense, and after examination of the machine by Army technical representatives, when the safety has been approved.

Official tests also will be conducted at Waco, Tex. Field by Army pilots experienced in experimental work. For such tests owners must submit own machines, one for a destruction test and one for performance. The Government will defray the expense.

Lectures on Aero Engineering

A series of evening lectures are being delivered at the Polytechnic Institute of Brooklyn, N. Y., by Alexander Schmitt, outstanding aeronautical engineer and technical editor of AVIATION AND AERONAUTICS. His courses, which deal with the theory of structural engineering and will provide a basis for subsequent work on the practice of aeronautical structural

Cats with Marked Backs

J. L. Cato, experimental engineer in charge of all development work of the L. W. F. Engineering Co., has resigned from that firm to develop for the Marks-Koshoff Company, Inc. a new aircraft bearing mechanism, which will power a new sporting type of monoplane of his own design.



A Great Naval Achievement

The remarkable flying boat shown in the photograph above is one of the epoch making achievements of naval aviation. It is the largest flying boat in the world—a craft capable of flying with eleven (11) tons. This same naval plane recently flew with fifty Navy men and pilot aboard.

Developed and built at The Curtiss Engineering Corporation, Garden City, by Naval Constructors working in collaboration with Glenn H. Curtiss and his engineers, it stands today as a proved product of unquestioned superiority, entirely American in its conception, evolution, manufacture and performance.

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Curtis Engineering Corporation, Garden City, L. I., N. Y.



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